Herbert F. York (1921–2009)

A Life of Firsts,

Often finding himself in the right place at the right time, the Laboratory's first director had a remarkable career.

an Ambassador for Peace

WHEN Herbert Frank York, the Laboratory's first director, died on May 19, 2009, he left behind an enduring legacy as a scientific innovator and diplomat for a more peaceful world. In his autobiography, *Making Weapons, Talking Peace: A Physicist's Odyssey from Hiroshima to Geneva*, York remarks about himself and fellow physics graduate students at the University of California (UC) at Berkeley, "We were in exactly the right place at the right time." He was referring to their ability to obtain far more research time on the new giant cyclotron for their own projects than would have been possible a few years later. Yet, that statement appears to apply to many events in the early years of his professional life.

York's appointment as director of the new nuclear weapons laboratory in 1952 established a pattern of "firsts" that was to continue for a decade. In 1958, he was selected as the first chief scientist for the new Advanced Research Projects Agency (ARPA) in Washington, DC, and not long afterward, he became the first director of Defense Research and Engineering. Then in 1961, York returned to California as the founding chancellor of UC's newly established campus at San Diego.

The Laboratory's first director, Herbert Frank York (shown at left in 1984), died on May 19, 2009. In 1956, York (above, second from right) was one of many Laboratory and University of California employees who traveled to the Pacific Proving Grounds for Operation Redwing.

Lawrence Livermore National Laboratory

During his tenure in Washington, York experienced a change of heart about the role of nuclear weapons. Specifically, he came to believe that ending war was done most effectively by not starting one in the first place. He turned to arms control, with a nuclear test ban as a first step. Over the course of his long career, York was an advisor on arms control to six U.S. presidents and served on the President's Science Advisory Committee and the scientific advisory boards of the Army and Air Force. A hallmark of his career was his conviction that science and policy making should be above politics. He thus supported or opposed policies based strictly on his scientific judgment and served in both Democratic and Republican administrations.

York's extreme modesty is evident in his autobiography. Sybil York, his wife of 61 years, notes that he would likely be bemused by all the "flap and flurry" in the press that have accompanied his death. In addition to his wife, York leaves three children and four grandchildren.

A Career of Service

Herb York was born on November 24, 1921, in Rochester, New York, and in 1943, he received an M.S. in physics from the University of Rochester. World War II was well under way by then, and physicists of all stripes were in high demand. UC Berkeley beckoned, and York accepted the offer, arriving in May. At Berkeley, he worked for Ernest O. Lawrence, director of the University of California Radiation Laboratory and inventor of the cyclotron. As part of the Manhattan Project, York helped produce uranium on the calutron

This 1944 photo of York may have been used on his badge for the University of California Radiation Laboratory.

Emilio Segrè, a close protégé of physicist Enrico Fermi, became York's thesis advisor. "Fermi could explain anything in a way that seemed immediately understandable . . . but that turned out to be not so easily reproducible when I [thought] about it later." During his doctoral research, York codiscovered the neutral pi meson. He received a Ph.D. in physics in 1949 and in 1950 began what would be a brief career as an assistant professor of physics at UC Berkeley.

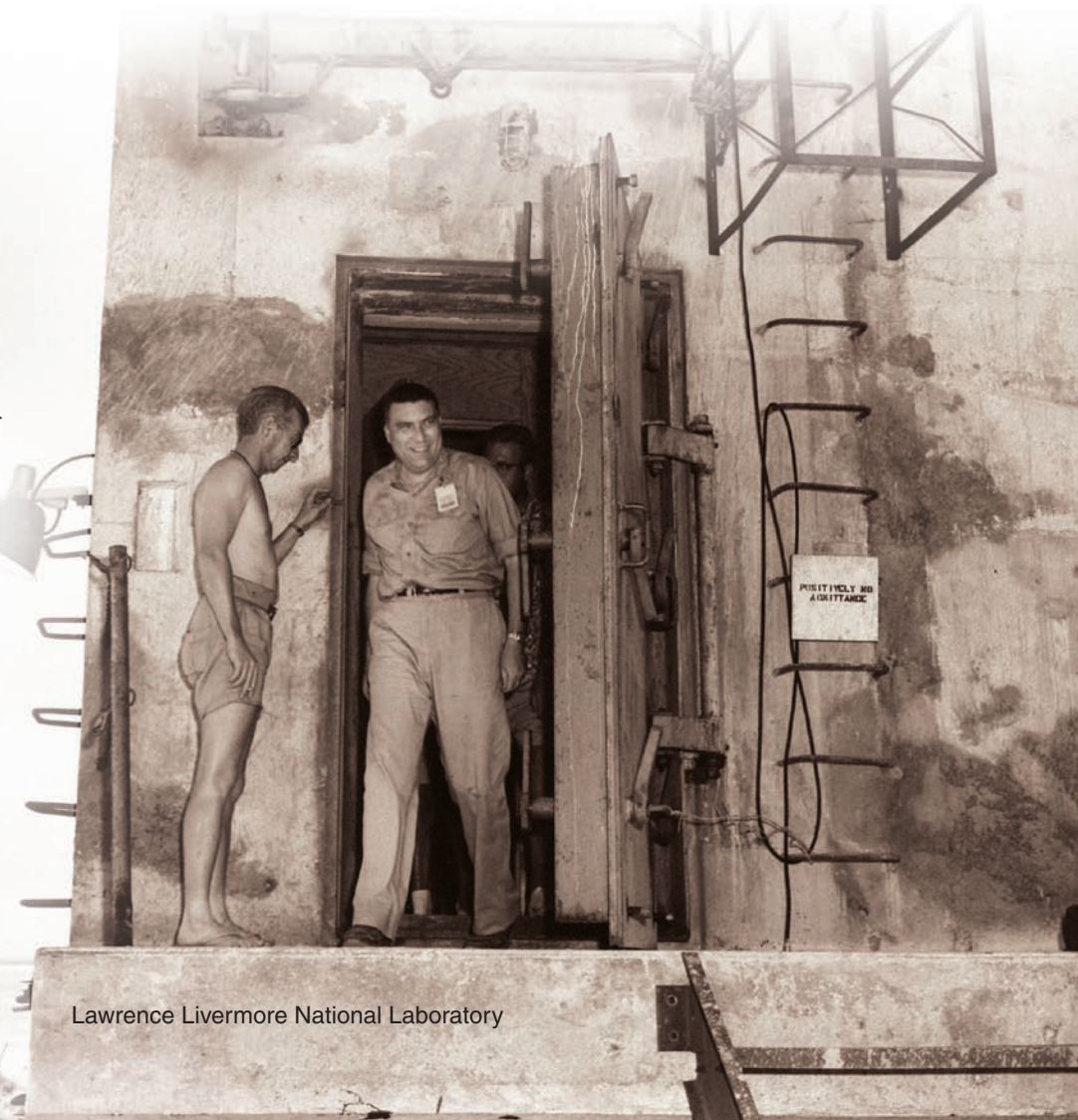
Working under Lawrence for eight years at Berkeley, York learned the managerial style that later served him so well at the new laboratory at Livermore. In his autobiography, York says, "Lawrence made it a regular practice to tour all parts of his laboratory. He visited the cyclotron . . . and would briefly take over the controls of the machine himself. Then he would tour the various experimental areas around the machine. . . . He also visited the drafting rooms and the mechanical and electrical shops; there he would ask the workmen to show him the various things they were doing. Later when I became a laboratory director myself, I deliberately and fruitfully copied this practice of his." Lawrence also created the model of how large-scale science should be pursued—through multidisciplinary team efforts.

Lawrence and renowned physicist Edward Teller had been advocating for a second nuclear weapons laboratory to augment the efforts of the laboratory at Los Alamos. One day, Lawrence asked York to draw up plans for the new research center. In his autobiography, York writes, "I began to sketch out my ideas about how to go about it: the first elements of a research program, new facilities, manpower, and

at Berkeley and at the Y-12 Plant in Oak Ridge, Tennessee, where the new process of electromagnetic separation of uranium-235 was being developed in support of the U.S. effort to build the first atomic bomb.

The Manhattan Project launched many careers, York's among them. However, York felt that his own career got off to a rather slow start. In a 1992 lecture at Livermore, he recalled, "When we were running the calutron, manufacturing uranium, I spent a lot of time sweeping up. I also painted racks to hold equipment." Fortunately, his days on the calutron were numbered.

After the war, York began doctoral studies in physics at UC Berkeley. J. Robert Oppenheimer, who had been director of the Manhattan Project, taught York's quantum mechanics class, and



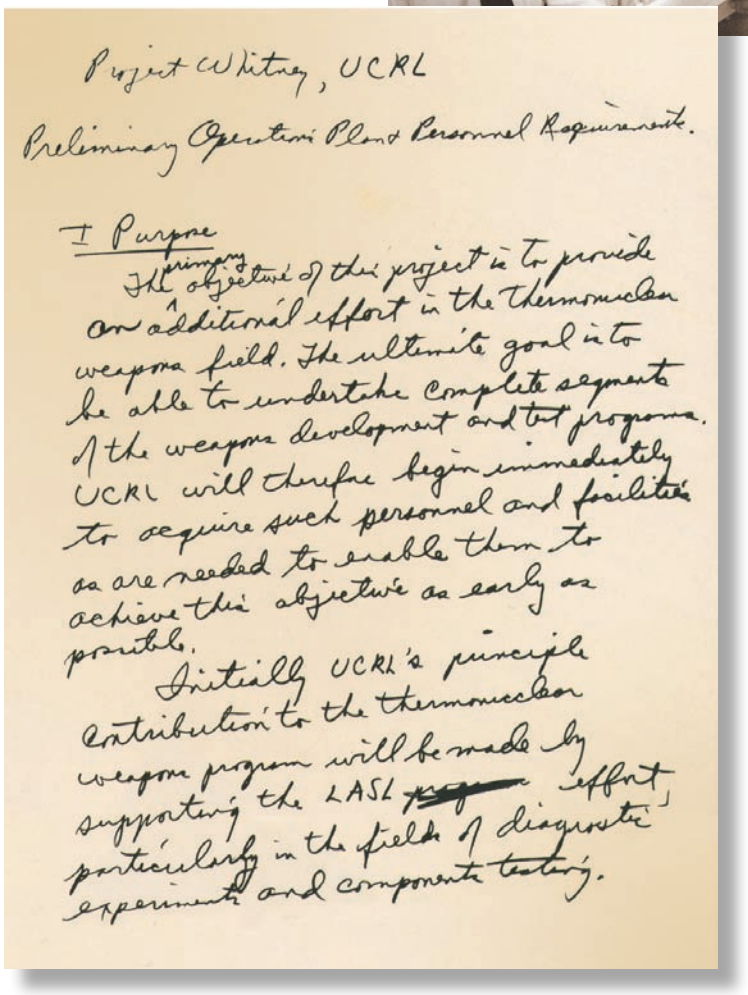
Lawrence Livermore National Laboratory

York (right) worked in a concrete bunker on the Enewetak Atoll during Operation Redwing, a series of seven thermonuclear tests conducted by the Laboratory in 1956.

the rest. After a few weeks of such work, Lawrence asked me if I thought I could 'run it.'" York was just 31 years old.

His family moved with him from Berkeley to Livermore, which in 1952 had a population of about 4,500. "We always lived as close as possible to where Herb worked," says Mrs. York. "He was devoted to the Laboratory, but he was a terrific family man, too. He always came home for dinner, read to the children, and put them to bed before returning to the Lab for the evening."

Livermore's cofounders (from left), Ernest Orlando Lawrence and Edward Teller, selected York as the new Laboratory's first director. (Courtesy of Jon Brenneis.)



Project Whitney, UCRL

Preliminary Operations Plan & Personnel Requirements.

I Purpose

The primary objective of this project is to provide an additional effort in the thermonuclear weapons field. The ultimate goal is to be able to undertake complete segments of the weapons development and test programs. UCRL will therefore begin immediately to acquire such personnel and facilities as are needed to enable them to achieve this objective as early as possible.

Initially UCRL's principle contribution to the thermonuclear weapon program will be made by supporting the LASL ~~prog~~ effort particularly in the fields of diagnostic experiments and component testing.

At Lawrence's request, York outlined plans for a second nuclear weapons laboratory at Livermore.

A New Ideas Laboratory

The new laboratory, established in September 1952, was born at the height of the Cold War. The Soviet Union had proved its success with its first atomic weapon, the Sino–Soviet partnership was increasingly menacing, and then China advanced into Korea. A few months later, the U.S. would detonate its first full-scale thermonuclear weapon, known as Mike, in a test over the Pacific.

York followed Lawrence's team-science approach and made Livermore a "new ideas" laboratory. York's philosophy was for the new Lab to always push at the technological extremes. "We did not wait for higher government or military authorities to tell us what they wanted and only then seek to supply it," he says in his autobiography. "Instead, we set out from the start to construct nuclear explosive devices that had the smallest diameter, the lightest weight, the least investment in rare materials, or the highest yield-to-weight ratio or that otherwise carried the state of the art beyond the currently explored frontiers."

At the 1992 Livermore lecture, York noted, "Lawrence had remarkable trust and confidence in people, especially young people. He thought people would grow to fill a responsibility, despite having no track record in the field. Everyone at the new Lab was in their 20s and 30s, except for the 44-year-old Teller. Lawrence and Teller had the credibility to convince the politicians in Washington, DC, that these youngsters could make the Lab work."

The new managerial team was indeed a young bunch. Harold Brown, 24 years old and one of York's best friends, headed A Division, which was chartered to design light, small thermonuclear weapons. (Just a few years earlier, Brown babysat at the Yorks' home in Berkeley so the couple could make a midnight dash to the hospital for the birth of their second daughter.) John Foster, another good friend and just 29, directed B Division, whose task was to build better fission bombs. "York's managerial style throughout his years as

director was highly informal," says Brown. "He was in charge but never authoritarian. He welcomed the exchange of new ideas." Both friends followed in York's footsteps to become Laboratory director, Brown serving from 1960 to 1961 and Foster from 1961 to 1965.

"From the beginning, York's most challenging task was to mediate between Teller and Lawrence and their very different goals for the new laboratory," says Brown. "Teller wanted the Lab to be as big as possible. Lawrence was more cautious, encouraging York to start small and work up, broadening the Lab's goals as successes mounted."

According to Brown, the successes did not come immediately. "We were trying to do a lot, develop new instrumentation for nuclear tests, fundamental physics measurements, and of course, new weapons designs. The first two years were not great, and some programs did not work well. But we learned from our mistakes. After two years, we began to move in radically successful directions."

A major breakthrough was the design of a high-yield warhead small enough to fit on a ballistic missile that could be launched from a submarine. It made possible the Polaris program, and since then, the U.S. has stationed much of its nuclear deterrent safely and securely at sea. The Laboratory went on to develop even smaller strategic warheads—compact enough that a single missile could carry several warheads.

Programs in fusion energy and advanced computations also were part of the Laboratory's initial research portfolio. Livermore acquired the fifth UNIVAC computer in 1953 as well as first editions of the increasingly more powerful and faster computers that followed. Site 300, the remote experimental test facility, opened in 1955. Under York's leadership, the Laboratory grew from a staff of 123 and a first-year budget of $600,000 to a workforce of 3,000 employees and an annual budget of $55 million by March 1958.

Washington, DC, and Change

York's position as Laboratory director brought him into regular contact with movers and shakers in Washington, DC, and he participated in half a dozen high-level scientific advisory organizations. The Soviet Union launched Sputnik, the world's first Earth-orbiting artificial satellite, in October 1957. In response, President Dwight D. Eisenhower created ARPA as a research and development organization under the Department of

The York family visited the office of the Secretary of Defense when York was sworn in as director of Defense Research and Engineering (from left): Sybil, Cynthia, Herb, Rachel, and David. (Courtesy of the York family.)

Books by Herb York

- *Arms and the Physicist* (American Institute of Physics, 1995)
- *A Shield in Space? Technology, Politics, and the Strategic Defense Initiative* (University of California Press, 1989, with Sanford Lakoff)
- *Making Weapons, Talking Peace: A Physicist's Odyssey from Hiroshima to Geneva* (Basic Books, 1987)
- *Does Strategic Defense Breed Offense?* (University Press of America, 1987)
- *The Comprehensive Nuclear Test Ban* (California Seminar on Arms Control and Foreign Policy, 1979, with G. Allen Greb)
- *The Advisors: Oppenheimer, Teller, and the Superbomb* (W. H. Freeman, 1976)
- *Arms Control: Readings from* Scientific American (W. H. Freeman, 1973)
- *Race to Oblivion: A Participant's View of the Arms Race* (Simon and Schuster, 1970)

Defense and named York as its first chief scientist. A few months later, Eisenhower appointed York the first director of Defense Research and Engineering, serving as the civilian supervisor of missile and space research.

York moved to Washington in March 1958, in the middle of the school year, and rented a studio apartment during his first months there. He flew home to Livermore every other weekend until the school year was over and his family could join him on the East Coast. "He made a date with each of the children for a few hours every weekend that he was home," says Mrs. York. "One would want to go hiking; another wanted a sundae at the local soda fountain. Herb devoted a few hours exclusively to each child."

In his autobiography, York notes that he became an advocate for arms control during his time in Washington, DC, when he was exposed to the political arena. He served as a member of the first General Advisory Committee on Arms Control and Disarmament (1962–1969) and as the U.S. ambassador and chief negotiator for the Comprehensive Nuclear Test Ban (1971–1981). He also was part of the U.S. delegation to the 1965 conference on the application of science and technology held by UNESCO, the United Nations Educational, Scientific, and Cultural Organization, and to the 1978–1979 Soviet–American Arms Control Talks.

Teaching Peace

In 1961, UC again beckoned, this time for York to serve as the first chancellor of the newly established UC San Diego, which he did until 1964. In 1983, he founded UC's Institute on Global Conflict and Cooperation (IGCC), with the goal of directing the resources of the entire UC system, including Lawrence Livermore and Los Alamos national laboratories, toward nonproliferation and ending nuclear war. Today, IGCC is one of the nation's largest sources of dissertation and fellowship support for international studies students.

Says IGCC Director Susan Shirk, "Herb was the founder of the UC Institute on Global Conflict and Cooperation, our director emeritus, and the inspiration for IGCC's mission of bringing the knowledge generated by UC faculty and students to bear on policy efforts to prevent nuclear war and other forms of military conflict. Among his many achievements, he initiated the summer nuclear weapons policy training sessions and the track two dialogues, which have become hallmarks of IGCC."

York remained strongly engaged in the institute's activities until his death. "In recent years, his talks became the high point of our summer program on public policy and nuclear threats," says Shirk. "The students in the program could not get enough of his reminiscences about his involvement with the development of nuclear weapons and negotiations to control their spread and use, mixed with his cogent analysis of how to reduce current proliferation threats. And of course, he was a great role model to our students and to us of a scholar-diplomat who made the world a better place."

On hearing of York's death, Laboratory Director George Miller noted that York was instrumental in shaping the Laboratory and helped lay the foundation for the institution it is today. "Among Herb's many contributions is a legacy of team science, a defining characteristic of this Laboratory, and a commitment to applying science to strengthen national policy," says Miller. "His understanding of science, technology, and global geopolitical issues was the basis of his strong leadership in arms control. Herb contributed his talents and leadership broadly to the Laboratory, the University of California, and the nation. He is one of the true leaders of this Laboratory and a founding father we will never forget. He will be truly missed."

—Katie Walter

Herb York's Awards

2000	Clark Kerr Award for Distinguished Leadership in Higher Education, the highest honor bestowed by the University of California at Berkeley's Academic Senate
2000	Enrico Fermi Award, the government's oldest science and technology award honoring lifetime achievement, presented by President Bill Clinton for York's efforts and contributions in nuclear deterrence and arms control agreements
2000	Vannevar Bush Award for leadership in the arms control movement and work in nuclear energy, presented by the National Science Board, the policy-making arm of the National Science Foundation
1994	American Physical Society's Leo Szilard Award
1993	Federation of American Scientists' Public Service Award
1972–1973	Guggenheim Fellowship
1962	Atomic Energy Commission's Ernest O. Lawrence Memorial Award

Key Words: Advanced Research Projects Agency (ARPA), arms control, Herbert Frank York, Institute for Global Conflict and Cooperation (IGCC), University of California (UC) at San Diego.

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